

Assessing Stewardship Maturity: - Use Case Results and Lessons Learned

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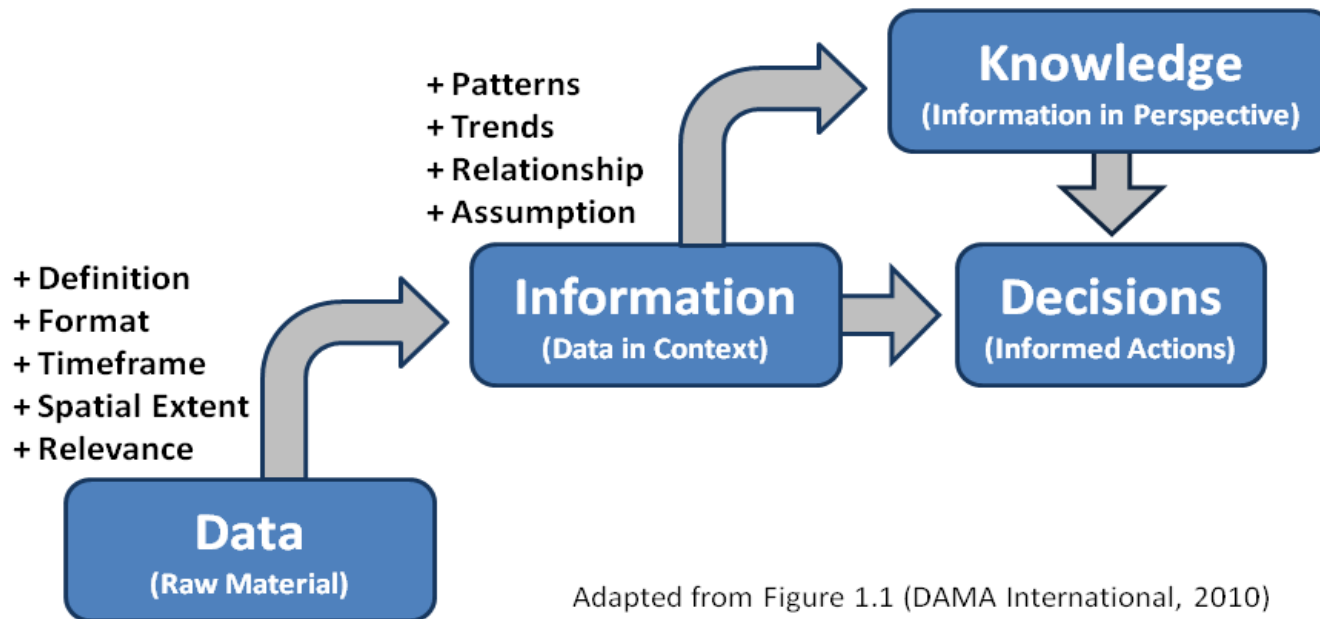
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Why Should We Care About Assessing Data Stewardship Maturity?

Pathway to Sound Decisions from Raw Data



- Quality of data and information, what being done with/to them matter!
- Knowing current data and stewardship maturity is essential in making informed and efficient management, data use and improvement decisions!



What Assessment Model Have We Used?

*A Data Stewardship Maturity Matrix (DSMM)
Developed Jointly by Scientists and Subject Matter
Experts from NCEI and CICS-NC*

Leveraging Institutional Knowledge and Community Best Practices and Standards



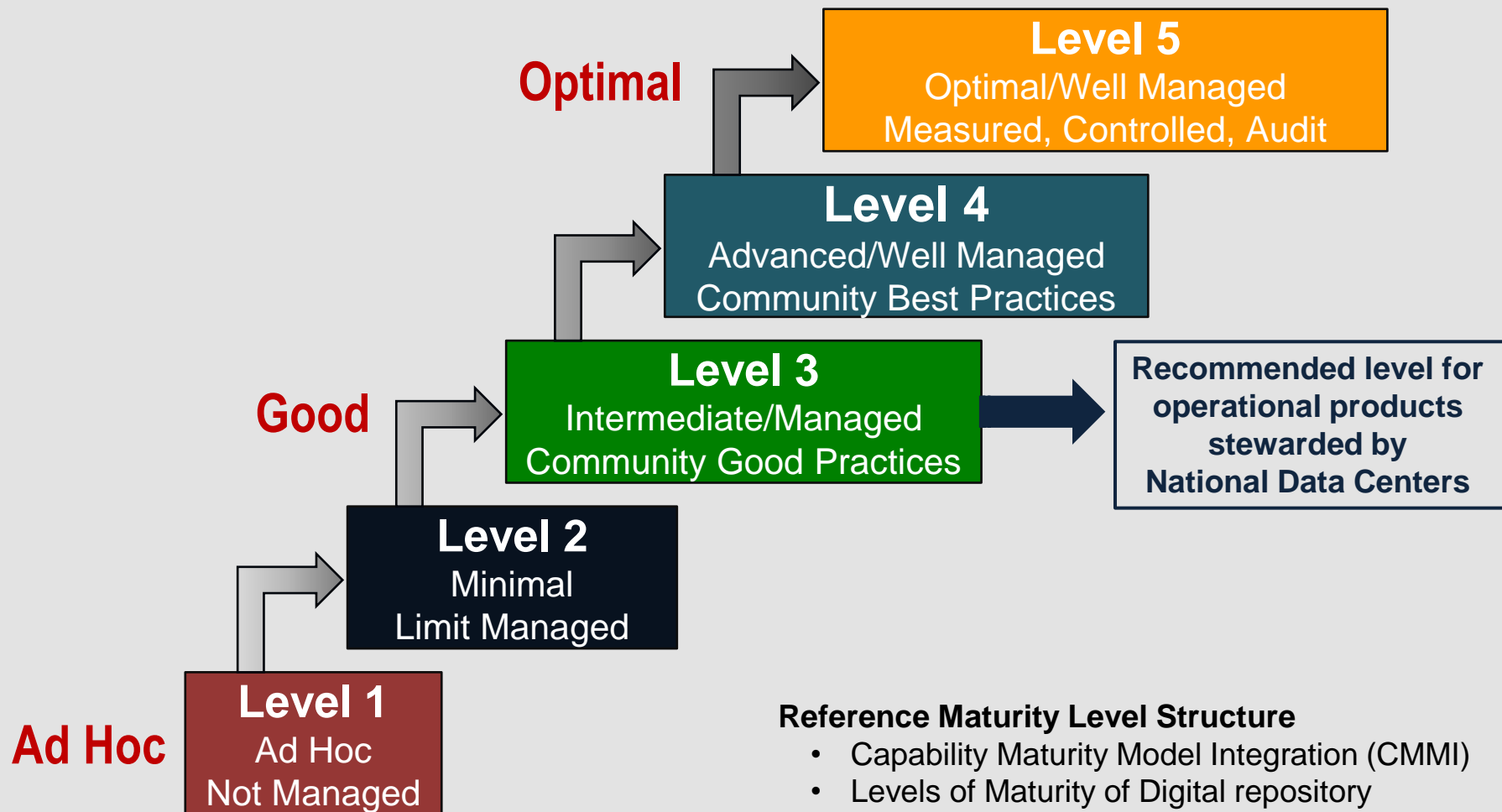
What Is the NCEI/CICS-NC DSMM?

*A Unified Framework for
Measuring **Stewardship Practices** Applied to
Individual Digital Earth Sciences Data Products*

DSMM Defines Measureable, Five-Level Progressive Practices in *Nine* Quasi-Independent Key Components

<div>Maturity Scale</div> <div>Key Component</div>	Level 1 - Ad Hoc Not Managed	Level 2 - Minimal Managed Limited	Level 3 - Intermediate Managed Defined, Partially Implemented	Level 4 - Advanced Managed Well-Defined, Fully Implemented	Level 5 - Optimal Level 4 + Measured , Controlled , Audit
Preservability	<i>The state of being preservable</i>				
Accessibility	<i>The state of being publicly searchable and accessible</i>				
Usability	<i>The state of data product being easy to understand and use</i>				
Production Sustainability	<i>The state of data production being sustainable and extendable</i>				
Data Quality Assurance	<i>The state of data product quality being assured/screened</i>				
Data Quality Control /Monitoring	<i>The state of data product quality being controlled and monitored</i>				
Data Quality Assessment	<i>The state of data product quality being assessed</i>				
Transparency /Traceability	<i>The state of being transparent, trackable, and traceable</i>				
Data Integrity	<i>The state of data integrity being verifiable</i>				

Stewardship Maturity Matrix Follows CMMI level Structure





NCEI Pilot DSMM Use Case Study

The Purposes

- Demonstrate the utility of DSMM and ensure consistency of its application to various data types
- Establish baselines for high-utility/impact NCEI core datasets (2–5 datasets)
- Explore requirements for collecting and capturing content-rich quality metadata

Selected NCEI Core Datasets

Data Type	Dataset	Status
Satellite – polar ocean	NOAA/NSIDC Sea Ice Concentration CDR	Baselined
GIS - regional	NCEI-CO Digital Elevation Models (DEM)	Initial assessment
Station - in situ - land	GHCN-M	Baselined
Station - gridded - land	National Climate Division (nCliDiv)	Not yet started
Satellite – global ocean	OI SST CDR	Initial assessment
Physical Records - In Situ Monthly Summaries	Local Climatological Data	Preliminary information collection

Examples of Stewardship Maturity Assessment Results

Data Stewardship Maturity Ratings for Global Historical Climatology Network-Monthly Version 3

Preservability	★	★	★	★	☆
Accessibility	★	★	☆	☆	☆
Usability	★	★	★	☆	☆
Production Sustainability	★	★	★	★	★
Data Quality Assurance	★	★	★	★	☆
Data Quality Control/Monitoring	★	★	★	☆	☆
Data Quality Assessment	★	★	★	☆	☆
Transparency/Traceability	★	★	★	☆	☆
Data Integrity	★	★	★	★	☆

Assessment Date: 09/04/2015 SMM Version: NCDC-CICS-SMM_0001 Rev. 1 12/09/2014

Global Historical Climatology Network (GHCN) – Monthly v3

Data Stewardship Maturity Ratings for NOAA/NSIDC Sea Ice Concentration Climate Data Record Version 2

Preservability	★	★	★	★	☆
Accessibility	★	★	☆	☆	☆
Usability	★	★	★	★	☆
Production Sustainability	★	★	★	★	☆
Data Quality Assurance	★	★	★	★	☆
Data Quality Control/Monitoring	★	★	☆	☆	☆
Data Quality Assessment	★	★	★	☆	☆
Transparency/Traceability	★	★	★	☆	☆
Data Integrity	★	★	★	★	☆

Assessment Date: 06/23/2015 SMM Version: NCDC-CICS-SMM_0001 Rev. 1 12/09/2014

Sea Ice Concentration Climate Data Record v2



Lessons learned

- **Actionable practices defined in the DSMM help & make it easier to define stewardship maturity requirements**
 - More beneficial to do so in the early stage of various functional procedures or processes (e.g., product development, archive, and access),
 - Beneficial to have more communication with and training to IPT (Integrated Product Team) members
- **This pilot use case study helps**
 - Better define a process for consistent and more scalable evaluation of other datasets,
 - Develop consensus on community standards & types and amount of documentations required,
 - Identify the strengths and weakness of both the dataset and organizational capability



Lessons learned – Cont.

- **Ensuring and improving data stewardship maturity requires a coordinated effort**
 - Well-defined and understood process and standardized document(s) associated with the process help ensure consistent maturity in all managed datasets and reduce effort for assessment (e.g., NCEI archival process and Submission Agreement)
 - Strong dependency on experience, domain knowledge and expertise
 - A consistent and effective way to collect, describe, and convey data quality information does not exist but is critically needed – its development requires a coordinated effort of data, technology, and science subject matter experts



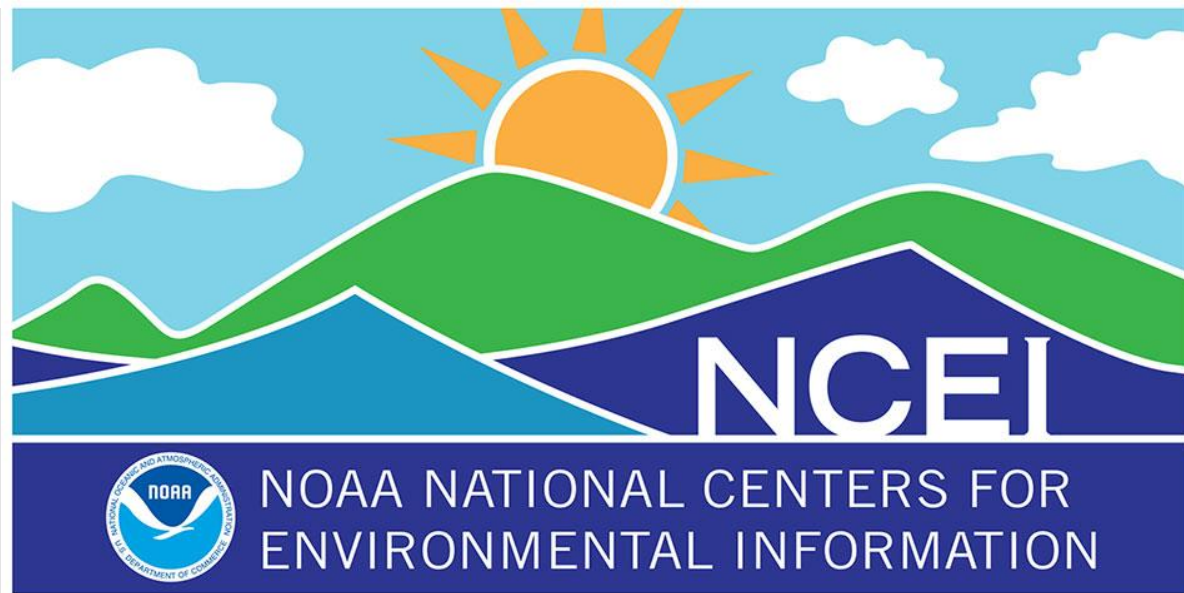
Future Work

- Integrate individual datasets stewardship maturity results into metadata, documentations and decision-support tools
- Develop a web-based MM-Stewardship system prototype to display and collect use cases as a proof of concept, collaborating with CICS-NC



Acknowledgement

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